

## REMARKS

The Office Action dated May 18, 2009 has been received and considered. In this reply, claims 1, 3-5, 7, 8, 21, and 66 are amended, and claims 89-102 are canceled. Thus, claims 1-88 are pending herein. Applicants respectfully submit that the amendments present the claims in better form for allowance. Applicants further submit that the amendments do not add new material, and support for the amendments may be found in the specification and drawings as originally filed. Further, claims 1, 3-5, 7, 8, 21, and 66 are amended without disclaimer and without prejudice. Applicants reserve the right to pursue the inventions of the originally filed claims and claims prior to this amendment later during the prosecution of this application or during a subsequently filed application. Reconsideration of the outstanding rejections is respectfully requested based on the following remarks.

1. Claims 1-5, 7-17, 19-32, 34-36, 41-42, 44, 46-47, 49, 54-56, 58-60 and 85-87 were rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Physica-C, 2000, V336, PP 70-74 (Xiong). This rejection is traversed for the following reasons.

Claim 1 is drawn to a method of depositing a biaxially textured film on a substrate and features depositing a film on a substrate with a deposition flux at an oblique incident angle while simultaneously bombarding the deposited film using an ion beam arranged along either the best ion texture direction or the second best ion texture direction of the film. The deposition flux incident plane is arranged parallel to a direction along which said biaxially-textured film has the fastest in-plane growth rate. Further, the angle between the deposition flux incident plane and the ion beam incident plane is about 45° or about 135°. Claim 17 depends from claim 1 with the

additional feature that the biaxially textured film comprises at least one of a rock salt type material, a  $\text{ReO}_3$  type material, and a perovskite type material. Claim 21 is similar to claim 1, except the angle between the deposition flux incident plane and the ion beam incident plane is about  $90^\circ$ . Applicants' discovered that the alignment of the ion beam incident angle and the deposition flux incident angle with particular crystal axes was necessary to necessary to achieve the desired biaxially texture film. Further, Applicants' discovered that the choice of the particular crystal axes is dependant upon the type of the material and the desired orientation of the crystal lattice.

Claim 41 is drawn to a method of depositing a biaxially textured film on a substrate and features depositing a film on a substrate with a deposition flux at an oblique incident angle while simultaneously bombarding the deposited film using an ion beam substantially parallel to substrate normal. Claim 54 is drawn to a method of depositing a biaxially textured film on a substrate and features depositing a film on a substrate with a deposition flux at an oblique incident angle while simultaneously bombarding the deposited film using an ion beam at a glancing angle along the substrate surface.

Xiong teaches depositing a biaxially texture  $\text{CeO}_2$  buffer layer with a deposition flux at an angle of  $10^\circ$  when the ion beam incident angle was  $55^\circ$ . Xiong also teaches depositing a biaxially texture  $\text{CeO}_2$  buffer layer with a deposition flux at an angle of  $20^\circ$  when the ion beam incident angle was  $45^\circ$ .

With respect to claim 1, Xiong does not teach, suggest, or provide motivation for using an angle between the deposition flux incident plane and the ion beam incident plane is about  $45^\circ$  or about  $135^\circ$ . With respect to claim 21, Xiong does not teach, suggest, or provide motivation

for the angle between the deposition flux incident plane and the ion beam incident plane is about 90°. Specifically, as shown in Fig. 2 of Xiong, the plane of the ion beam appears to be parallel (about 0° or about 180°) to the plane of the material plume, rather than at an angle of about 45°, about 135° or about 90°. Accordingly, claim 1 is not anticipated by Xiong. Further, absent applicants' own disclosure, one of ordinary skill in the art, based on the teachings of Xiong, would not have been motivated to use an angle between the deposition flux incident plane and the ion beam incident plane is about 45° or about 135° or about 90°. Accordingly, the USPTO has failed to provide a *prima facie* case of obviousness with respect to claims 1 and 21.

With respect to claim 17, Xiong does not teach, suggest, or provide motivation for the biaxially textured film comprising at least one of a rock salt type material, a  $\text{ReO}_3$  type material, and a perovskite type material. As discussed in paragraph [0042] of the Present Application,  $\text{CeO}_2$  is a fluorite type cubic material.  $\text{CeO}_2$  is not a rock salt type material, a  $\text{ReO}_3$  type material, and a perovskite type material as required by claim 17. Accordingly, claim 17 is not anticipated by Xiong. Further,  $\text{CeO}_2$  has a fast in-plane growth direction along the  $\langle 100 \rangle$  crystal axis (see paragraph [0042] of the Present Application). Rock salt type materials,  $\text{ReO}_3$  type materials, and perovskite type materials generally have growth rates along the  $\langle 111 \rangle$  and  $\langle 110 \rangle$  axes that are higher than the growth rate along the  $\langle 001 \rangle$  axis (see paragraph [0044] of the Present Application). Due to the differences between  $\text{CeO}_2$  and the claimed materials, one of ordinary skill in the art would not have a reasonable expectation of success of depositing a biaxially textured film consisting of either (i) a rock salt type material, a  $\text{ReO}_3$  type material, or a perovskite type material on a substrate with a deposition flux at an oblique incident angle while simultaneously bombarding the deposited film using an ion beam arranged along either the best ion texture direction or the second best ion texture direction of the film based on the teachings of

Xiong. Accordingly, the USPTO has failed to establish a *prima facie* case of obviousness with regards to claim 17.

With respect to claim 41, Xiong does not teach, suggest, or provide motivation for simultaneously bombarding the depositing film with an ion beam which is substantially parallel to substrate normal. With respect to claim 56, Xiong does not teach, suggest, or provide motivation for simultaneously bombarding the depositing film with an ion beam which is at a glancing angle along the substrate surface. As discussed above, Xiong teaches bombarding the depositing film with an ion beam at an angle of 45° or 55°. Accordingly, claims 41 and 56 are not anticipated by Xiong. Further, it has been well established in the art that the degree of biaxial texture of a film deposited using IBAD strongly depends on the incident angle of the ion beam, with an optimal incident angle of approx. 45° or 55° depending on the material used. Xiong teaches using these same incident angles for the ion beam when depositing with an oblique deposition flux angle. Accordingly, one of ordinary skill in the art, absent applicants' own disclosure, would not have been motivated to use either an ion beam that is substantially parallel to substrate normal, or an ion beam at a glancing angle along the substrate surface. Accordingly, the USPTO has failed to establish a *prima facie* case of obviousness with regards to claims 41 and 56.

Xiong fails to teach, suggest, or provide proper motivation for each and every feature of claims 1, 17, 21, 41, and 54. Accordingly, claims 1, 17, 21, 41, and 54 are not anticipated by, nor would they have been obvious over Xiong. Further, claims 2-5, 7-16, 19-20, 22-32, 34-36, 42, 44, 46-47, 49, 55-56, 58-60, and 85-87 depend directly or indirectly from claims 1, 17, 21, 41, and 54, and are allowable for at least the same reasons as the claims from which they depend. Accordingly, Applicants respectfully request withdrawal of these rejections over Xiong.

2. Claims 6, 18, 33, 43, 45, 48, 57, and 61 were rejected under 35 U.S.C. 103(a) as obvious over Xiong. Claims 37-40, 50-53, and 62-65 were rejected under 35 U.S.C. 103(a) as obvious over Xiong in view of US 6,537,689 (Schoop). Claims 6, 18, 33, 37-40, 43, 45, 48, 50-53, 57, 61, and 62-65 depend directly or indirectly from allowable claims 1, 17, 21, 41, or 54 and are allowable for at least the same reasons as claims 1, 17, 21, 41, or 54. Accordingly, Applicants respectfully request withdrawal of these rejections.

3. Claims 66-84 and 88 were rejected under 35 U.S.C. 103(a) as obvious over Xiong in view of Schoop and US 6,821,338 (Reade). This rejection is traversed for the following reasons.

Claim 66 is drawn to a method of depositing a biaxially textured film on a substrate and features depositing a film on a substrate with a deposition flux at an oblique incident angle while simultaneously bombarding the deposited film using an ion beam, wherein the biaxially textured film comprises a non-cubic layered structure. The resulting film has a c-axis oriented substantially parallel to the surface of the film.

Turning to the cited prior art, the USPTO acknowledges that Xiong and Schoop, in combination, fail to teach a biaxially textured film comprising a non-cubic layered structure. Accordingly, the USPTO turns to Reade for allegedly teaching that RuO<sub>2</sub> is equivalent to CeO<sub>2</sub>. Reade teaches forming the biaxial textured film by impinging an ion beam on a film after deposition, rather than during deposition. See Reade at col. 3, lines 33-43. Xiong and Schoop teach biaxially films having a c-axis aligned substantially perpendicular to the film surface. Further, in Example 1 of Reade, the YSZ film has a c-axis aligned substantially perpendicular to the film surface. None of Xiong, Schoop, or Reade teaches or suggests a biaxially textured film having a c-axis oriented substantially parallel to the surface of the film. Thus, one of ordinary

skill in the art upon reading Xiong, Schoop, and Reade would not have an expectation of forming a film having a c-axis oriented substantially parallel to the surface of the film, as claimed. As such, the USPTO has failed to establish a *prima facie* case of obviousness with regards to claim 66. Further, claims 67-84 and 88 depend directly or indirectly from claims 1 and 66 and are allowable for at least the same reasons as the claims from which they depend. Accordingly, Applicants respectfully request withdrawal of these rejections over Xiong, Schoop, and Reade.

Applicant(s) respectfully submit that the present application is now in condition for allowance. Accordingly, the Examiner is requested to issue a Notice of Allowance for all pending claims.

Should the Examiner deem that any further action by the Applicants would be desirable for placing this application in even better condition for issue, the Examiner is requested to telephone Applicants' undersigned representative at the number listed below.

Applicant(s) does not believe that any additional fees are due, but if the Commissioner believes additional fees are due, the Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 50-3797.

Respectfully submitted,

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Date

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